

Translation

PATENT COOPERATION TREATY

PCT/JP2003/002603



PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference YG2002-53PCT | FOR FURTHER ACTION See Form PCT/IPEA/416 | |
| International application No. PCT/JP2003/002603 | International filing date (<i>day/month/year</i>) 05 March 2003 (05.03.2003) | Priority date (<i>day/month/year</i>) 10 September 2002 (10.09.2002) |
| International Patent Classification (IPC) or national classification and IPC C08G 8/04, B82B 1/00, B01J 20/26, G01N 37/00, 33/53, C01B 31/02, H01L 29/12, H01M 8/02 | | |
| Applicant JAPAN SCIENCE AND TECHNOLOGY CORPORATION | | |

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| 1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. |
| 2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet. |
| 3. This report is also accompanied by ANNEXES, comprising: a. <input type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of _____ sheets, as follows: <div style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</div> b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). |
| 4. This report contains indications relating to the following items: <div style="margin-left: 20px;"><input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application</div> |

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| Date of submission of the demand 04 March 2004 (04.03.2004) | Date of completion of this report 11 August 2004 (11.08.2004) |
| Name and mailing address of the IPEA/JP | Authorized officer |
| Facsimile No. | Telephone No. |

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☒ The international application as originally filed/furnished

☐ the description:

pages _____, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the claims:

pages _____, as originally filed/furnished

pages* _____, as amended (together with any statement) under Article 19

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the drawings:

pages _____, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

| | | | |
|-------------------------------|--------|------------------|-----|
| Novelty (N) | Claims | 3, 5, 6-11 | YES |
| | Claims | 1, 2, 4, 12-14 | NO |
| Inventive step (IS) | Claims | 3, 6, 7 | YES |
| | Claims | 1, 2, 4, 5, 8-14 | NO |
| Industrial applicability (IA) | Claims | 1-14 | YES |
| | Claims | | NO |

2. Citations and explanations (Rule 70.7)

The ISR cites the following documents 1-10:

Document 1: "Synthesis of Phenol/Furfural Polymer Nanotubes," (Masafumi Uota, Daisuke Fujikawa, Shinji Mouri, Masako Kuroki, Katsuya Kaikake, Mitsunori Yada, Masato Machida and Tsuyoshi Kijima), Abstracts of the 23rd General Symposium on Fullerene Nanotubes, 17 July, 2002 (17.07.02), page 48

Document 2: "Mold Synthesis and Properties of Phenol/Furfural-based Nanotubes (in Japanese)," (Daisuke Fujikawa, Masafumi Uota, Mitsunori Yada, Masato Machida and Tsuyoshi Kijima), Extended Abstracts of Joint Kyushu Conference of Chemistry-related Branches, 19 July, 2002 (19.07.02), Vol. 39, page 216

Document 3: "Mold Synthesis and Properties of Phenol/Furfural-based Nanotubes (1) (in Japanese)," (Daisuke Fujikawa, Masafumi Uota, Mitsunori Yada, Masato Machida and Tsuyoshi Kijima), Extended Abstracts of the Chemical Society of Japan, 11 March, 2002 (11.03.02), Vol. 81, No. 1, page 194, ISSN 0285-7626

Document 4: "Mold Synthesis and Properties of Phenol/Furfural-based Nanotubes (2) (in Japanese)," (Daisuke Fujikawa, Masafumi Uota, Mitsunori Yada, Masato Machida and Tsuyoshi Kijima), Extended Abstracts of the Chemical Society of Japan, 11 March, 2002 (11.03.02), Vol. 81, No. 1, page 195, ISSN 0285-7626

Document 5: JP, 2001-860, A (Toyota Motor Corp.), 9 January, 2001 (09.01.01)

Document 6: JP, 2002-173308, A (Mitsubishi Chemical Corp.), 21 June, 2002 (21.06.02)

Document 7: JP, 2000-203826, A (Japan Science and Technology Corp.), 25 July, 2000 (25.07.00)

Document 8: JP, 8-325195, A (NEC Corp.), 10 December, 1996 (10.12.96)

Document 9: JP, 2000-156423, A (International Business Machines Corp.), 6 June, 2000 (06.06.00)

Document 10: JP, 2002-75420, A (Sony Corp.), 15 March, 2002 (15.03.02)

(1) Claims 1, 2, 4 and 12-14

Documents 1-3 respectively describe a method for producing phenol-based polymer nanotubes, comprising the steps relating to claims 12-14 of the present application, and further describe that the said nanotubes of 1.5 to 5 nm in inner diameter and 1.5 to 2.5 nm in thickness can be obtained. Furthermore, judging from the photos shown in documents 1 and 2 and the production methods described in documents 1-3, it is considered that they have a length of 10 nm or more.

Moreover, document 4 describes phenol-based polymer nanotubes of 1.5 to 5 nm in inner diameter and 1.5 to 2.5 nm in thickness, and judging from the production method, it is considered that they have a length of 10 nm or more.

Therefore, the subject matters of claims 1, 2, 4 and 12-14 of the present application do not appear to be novel or to involve an inventive step.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: V.2

(2) Claims 5 and 8-11

Document 5 describes that carbon nanotubes are used as an adsorbent, and document 6 describes that a tubular carbon material is produced using a phenol resin as a precursor. Furthermore, document 7 describes that carbon nanotubes are used as molding agents for an inorganic material, and document 8 describes that carbon nanotubes are used as molding agents for a metallic material. Moreover, document 9 describes that carbon nanotubes are used as electronic circuit elements, and document 10 describes that carbon nanotubes are used as an electrolyte of fuel cells.

Therefore, a person skilled in the art could have easily conceived of applying the phenol-based polymer nanotubes described in documents 1-4 to the various applications relating to claims 5 and 8-11 of the present application.

So, the subject matters of claims 5 and 8-11 of the present application do not appear to involve an inventive step in view of the inventions described in documents 1-10.

(3) Claims 3, 6 and 7

The subject matters of claims 3, 6 and 7 of the present application are neither described in any of the above-mentioned documents nor obvious to a person skilled in the art.

Therefore, the subject matters of claims 3, 6 and 7 of the present application appear to be novel and to involve an inventive step.